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Title: Virtual, electronic debit/credit/customercard-payments over the internet

IPC: -

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Patent- og Varemærkestyrelsen  
Økonomi- og Erhvervsministeriet

30 November 2006

A handwritten signature in cursive script, appearing to read 'Susanne Morsing'.

Susanne Morsing

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Modtaget

The submitted invention covers an expanded electronic use of the existing and future debit-/credit/customer cards (national and international) as secure means of payments for shopping on the Internet. The name Internet will in the following designate the Internet, other public- or semipublic networks, private or semiprivate networks.

5 The existing debit/credit/customer cards, issued by the many national or international cardcompanies, are today used as means of payment for shopping on the Internet. However, the use of these cards are still connected with a certain risk for fraud. Today, several different, technical solutions have been developed to minimize the risk (SSL, SET and others), but these solutions are characterized by their complexity and inconvenience, and the result is, that the users of debit/creditcards are still very reluctant to  
10 use the cards on the Internet.

The objective for the described invention is to eliminate the before mentioned risk for fraud, and to develop a simple, easy and cheap solution to the security problems, which will dramatically increase the use of debit/credit/customercards as secure means  
15 of payments on the Internet.

The invention covers the use of a virtual (non-physical), electronic debit/credit/customercard, constructed electronically the same way as the existing, physical cards, but the virtual, electronic card is only valid as long as the electronic verification/payment is processed, whereupon the virtual card is made invalid and cease to exist.  
20 The virtual card works as a once-only card, and can contain the precise amount to be paid, a maximum amount to be bought for, or it can be used as a "small-coins" card.

The invention has several fields of application as listed below:

- 1) Secure means of payment on the Internet provided that the person in question already has a physical, valid debit/credit/customercard.
- 25 2) As secure means of payment on the Internet without the person in question possessing a physical debit/credit/customercard.
- 3) As secure means of payment on the Internet with/without a physical customercard issued by e.g. department stores, supermarkets, postalorder companies, gasoil companies, business chains etc. which wants their customers to buy products/goods on  
30 the Internet.
- 4) As identification of a person/company to another person/company as the invention inherently contains a identification process.

The above mentioned fields of application must however in no way be considered as being limited to these, as new fields of application can be constructed based on  
35 the invention.

**AD. 1: As secure means of payment on the Internet provided that the person in question already has a physical valid debit/credit/customer card**

A precondition for use of the virtual, electronic card is (in this case), that the person, who wants to pay with a debit/credit/customercard on the Internet, **already has a physical, valid debit/credit/customer card.**

The virtual electronic card is issued on-line by the cardcompanies sysems or the card company's Internetbank, and the virtual cardnumber is send on-line, electronically to the person, who wants to make a payment on the Internet. This can be done by the customer instructing the cardcompany, that he wants to be able to pay on the Internet. Can suitable be made the following way:

1. At the time when a new, physical card is issued or renewed.
2. An existing cardholder instructs the cardcompany or the Internetbank, that he/she wishes to be able to pay on the Internet.

When 1 or 2 above is done, the cardholder will receive the ID's and passwords, etc., necessary for accessing the cardcompany's system or Internetbank (if this has not already been done when the cardholder was established as an Internetbank customer).

When the cardholder wants to make a payment on the Internet, he connects to the cardcompany's system/Internet bank, selects the menu e.g. "Internet Payment", and he then receives a **virtual cardnumber** and an expire date. At this point, the particular virtual cardnumber is marked in the database as a **valid cardnumber issued to the cardholder** and it is also time-stamped (date, hour, min. sec.), to give a complete unambiguous identification.

The virtual cardnumber and expire date are now used directly to carry out the payment for goods bought at an Internet-shop. When the verification-process and/or the final payment process is finished or if a specified amount of time has passed without the card/cardnumber has been used, then the virtual cardnumber is made invalid in the card database. The virtual, electronic card acts as a once-only card.

A copy of the cardnumber together with all relevant data is made (log-file), as documentation for the payment/not used virtual cards.

The invention is based on the idea, that the cardnumber which is **issued to the virtual card**, is taken from the **pool of free cardnumbers**, normally used when issuing new, physical cards. As the person, who wants to make a payment on the Internet already has a valid, physical card, then there is no need to go through the normal application procedure. Therefore it is safe to send the virtual cardnumber directly (electronically) to the customer via the Internet. It is only the virtual cardnumber and expire date, which is used, to make the payment. **The virtual cardnumber will, to the different computersystems involved look exactly like a normal, valid physical card issued to the person/customer, which means no change to the existng infrastucture.**

When the payment has taken place, the virtual cardnumber is placed as the last, free cardnumber in the card database. In effect, the pool of free, physical cardnumbers is dynamically used as virtual cardnumbers.

5 The fact, that the use of virtual cardnumbers, which in contents and stucture already follows the agreed standards for the different debit/credit/customercard systems, and as it is merely an activation of a card (like issuing a new, physical card), results in the great advantage, that the receiving computer systems need not to be changed.

10 The invention can be used by all existing and future cardcompanies all over the world, and can be implemented successively by the different cardcompanies. There is no way the virtual card can be tampered with, as each card is individual identifiable and as such can be regarded as a "once-only"- card or as a disposable card. The virtual card exists and is valid only during the payment process.

**AD 2. As secure means of payment on the Internet without the person in question having a physical debet/credit/customer card.**

15 As the invention is based upon the fact that the person who wants to make an Internet payment must connect to his cardcompay's system/Internetbank, then it is implicit that the person already is known and accepted as customer of the system in question. This already established customer relationship can be used to give the customer (or  
20 certain customer groups) the opportunity to pay on the Internet without any physical debit/credit/customercard. The system/the Internet bank in question is able to mark the customers in their database, who are allowed to pay on the Internet without ha-  
ving a physical card issued. When such a customer connects to the cardcompany-  
/Internet bank and reaches the menu point e.g. "Internet Payment" the system checks, if this particular service is valid for this-customer, if yes, the system makes the same  
25 procedures as if the person already had a physical valid card. This means that a virtual cardnumber and expire date are returned as described under 1) (the expire date will in this case be todays date or a system dependent date).

**AD 3. As secure means of payment on the Internet with/without a physical custo-  
30 mercard issued by e.g. department stores, supermarkets, postalorder companies, gasoil companies, business chains etc., which wants their customers to be able to buy products/goods on the Internet.**

The invention can be used in connection with all kind of customercards where the customer is identified by a cardnumber. The cardcompany- system must have the same functionality as the Internetbank system as described under fields of application 1).  
35 This means that the cardcompany must have a system (equivalent to a Internetbank system), which can be accessed via the Internet. Furthermore the cardcompany must also have an invoicing system at his disposal in order to invoice the customer for the pur-  
chases made with virtual customercard.

**AD 4: As identification of a person/company to another person/company as the invention inherently contains an identification process.**

As the invention is based upon the fact that the customer is approved by a bank or a cardcompany, which gives the customer the possibility to pay on the Internet with virtual debit/credit/customercard, then it is possible, that 2 persons/companies can identify themselves to each other by making fictive payments to each other using virtual debit/credit/customercards. This can be of great importance for B2B commerce.

**In general.**

In general, the invention covers situations, where x number of persons are identifiable via a number (f.ins. a cardnumber) in a database or similar construction. It is necessary, that x is a relative high number and that there is free numbers available. x can be calculated in each particular situation.

The invention can then be applied, when the persons mentioned above wants to carry out a function on the Internet normally based on the identification-number (normally a cardnumber), but the function can be carried out **totally secured**, based on the use of a **virtual number** (as described earlier).

The invention can change the existing use of **physical** debit/credit/customercards as means of payment on the Internet, as the invention carries the possibility to introduce the ultimative, global **virtual** paymentsystem for the Internet. The customers can be identified by a international/global numbersystem (like the international creditcard numbers), but without issuing a physical card. The payment transactions will then be carried out solely based on **virtual** cards.

**The invention can be exploited by and covers all kinds of electronic equipment which now and in the future can connect to the Internet, this means all kinds of electronic equipment, computer systems, PC's, mobile telephones, wireless telephones combined with all kinds of debet/credit-/customercards. The potential for the use of virtual, electronic debit/credit/customer cards as secure means of payment on the Internet, is estimated to be tremendous.**

(see page 9 for an overview).

## CLAIMS.

1. Electronic debit/credit/customer cards used for payments on the Internet or other non-secure network, characterized by the fact, **that it is virtual cards.**
- 5 2. Virtual, electronic debit/credit/customer cards, according to claim 1), characterized by the fact that the structure of the cards and cardnumbers is either identical to the structure (in the card database and/or in the computer systems behind), which already now is used by the existing national or international cardissuing-companies, or a subset of their structure.
- 10 3. Virtual, electronic debit/credit/customer cards, according to claim 1) and 2), characterized by the fact that the individual virtual card's number is taken as one of the free numbers from the pool of free card numbers which are used for issuing new physical debet/credit/customer cards at the cardcompany in question.
- 15 4. Virtual, electronic debit/credit/customer cards, according to claim 1), 2) and 3), characterized by the fact that the virtual card is marked in the card database as valid and in use by the customer in question (like establishing a **new** debit/credit/customer card). The expire date for the virtual card is equivalent to the expire date of the physical card the customer already holds.
- 20 5. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3) and 4) characterized by the fact that the individual card is uniquely identified (cardnumber + year, month, day, hours, min., sec.).
- 25 6. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3), 4) and 5) characterized by the fact that the cardcompany's system or Internet-bank issues the virtual cards (on-line via the Internet) on demand. This means that when the customer wants to pay on the Internet and asks for a virtual card, then a virtual cardnumber is returned and an expire date. At the same time an electronic logging of all relevant data (the customer, the virtual cardnumber, time, etc.) is made in order to prove, that the virtual card has been issued.
- 30 7. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3), 4), 5) and 6) characterized by the fact that the individual card is only valid/exists in the moment of payment/process of payment. This means that when the virtual card is used as payment on the Internet it is made invalid in the card database the moment the authorization and/or payment process is ended. Before, an electronic logging of all the necessary data is made, to prove the completion of the payment.

- 5 8. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3), 4), 5), 6) and 7) characterized by the fact that if the virtual card is not used within a specific time-lapse (chosen by the cardcompany) or the purchase for some reason was not completed, the virtual debet/credit-/customer card is made invalid (marked in the card database as invalid) and an electronic logging of the necessary data, as documentation, is executed.
- 10 9. Virtual, electronic debet/credi/customer cards according to claim 1), 2), 3), 4), 5), 6), 7) and 8) characterized by the fact that when the payment has been effected, the virtual card will be invalid and the virtual cardnumber will be placed behind the others in the pool of free cardnumbers, which are used to issue new, physical debet/credit/customer card. This means that the pool of free cardnumbers in the different cardcompanies' systems the whole time dynamically are used for virtual debet/credit/customer cards concurrently with the demand for payments on the Internet.
- 15 10. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3), 4), 5), 6), 7), 8) and 9) characterized by the fact that the virtual electronic card can also be used by persons who do not possess a physical valid debet/credit/customer card. The card company's system or Internet bank must have an approved supplier/customer relationship e.g. being customer in a bank. The bank must in the range  
20 of services have the possibility that the customer or certain groups of customers are offered the possibility of payment on the Internet via a virtual card issued by the card company's Internet system or Internet bank **without a physical card being issued.**
- 25 11. Virtual, electronic debet/credit/customer cards according to claim 1), 2), 3), 4), 5), 6), 7), 8), 9) and 10) characterized by the fact that the customer X as stated in claim 6) has a virtual cardnumber electronically transferred. This virtual cardnumber can be used by customer X to make a fictive payment to Y. If Y gets an OK for the payment, then X will be a known and accepted customer at the card company. A similar payment from Y to X will make Y a known and accepted customer at the  
30 card company. In this way two companies unknown to each other can make sure that both are known and accepted by the card company (often a bank).

## SUMMARY.

Virtual, electronic debit/credit/customercard payments on the Internet or other non-secure network.

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The submitted invention concerns an expanded electronic use of existing and future debit/credit/customer cards (national as well as international), as secure means of payment for buying goods on the Internet.

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The invention concerns the use of virtual (not physical), electronic debit/credit/customercards, electronically build and shortly electronically connected to the existing issued cards. But the virtual, electronic debit/credit/customer card exist only as long as the payment process takes place, whereupon the virtual card is invalid and cease to exist. A precondition for use of the virtual, electronic debit/credit/customercard is normally, that the person who wants to pay on the Internet, already has a valid, physical debit/credit/customercard. But the invention also open up the prospect of paying on the Internet without a physical card being involved.

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The virtual, electronic debit/credit/customercard is issued on-line of the existing or future cardcompanies. The person, who wants to make payments on the Internet, connects to the system of the card company/Internet-bank, wherefrom he/she already possesses a physical card (or has an already established customer relationship) and indicates that he/she wants to make a payment on the Internet. The system will return a virtual debit/credit/customer cardnumber and expiring date, which will be used for the payment. The virtual cardnumber is taken from the pool of free cardnumbers used for issuing of new, physical cards from the particular cardcompany.

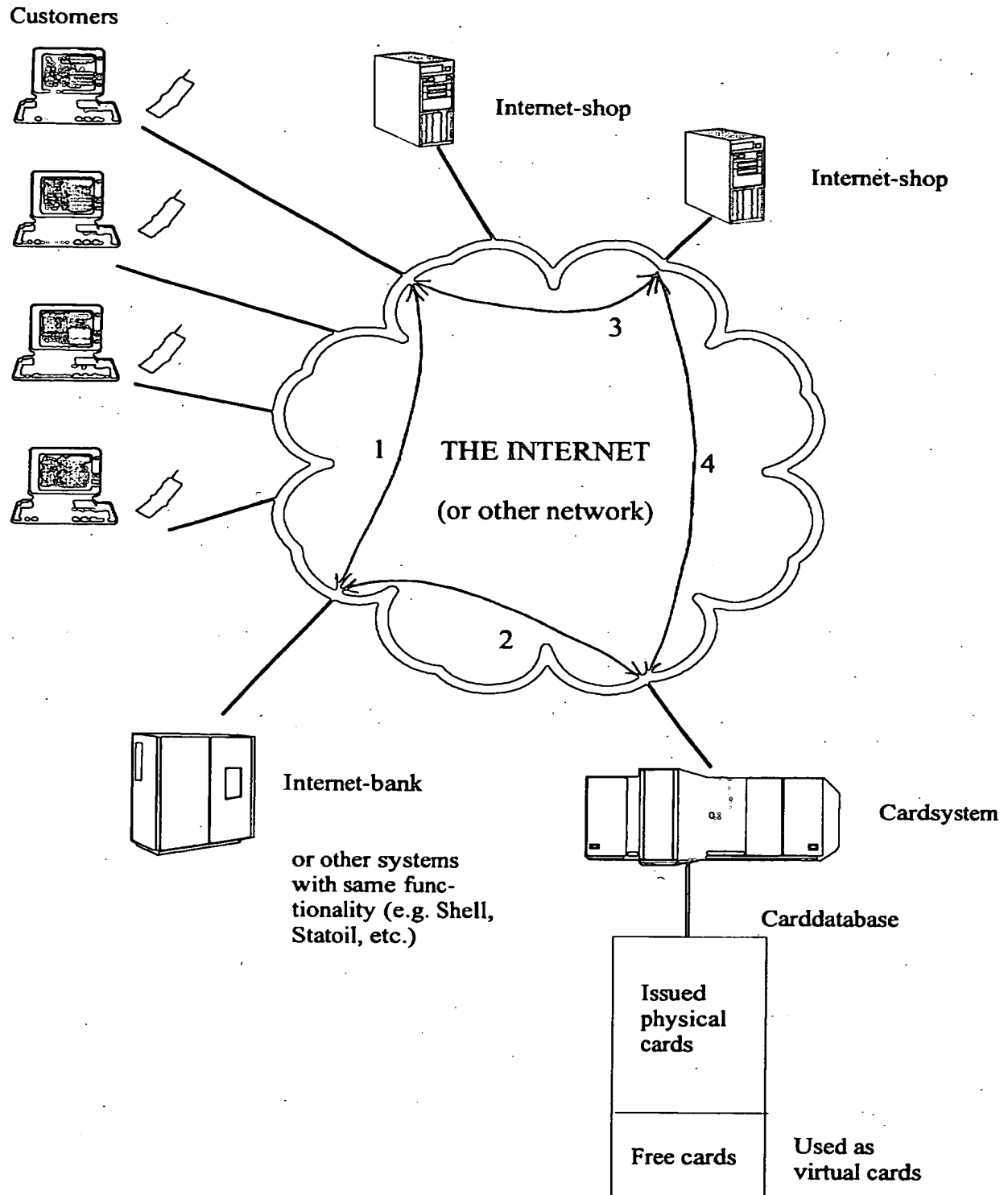
20

When the payment is finished, the virtual cardnumber is made invalid and the number will return to the pool of free cardnumbers (as the last). This means that the virtual card operates and can be looked upon as a once-only card.

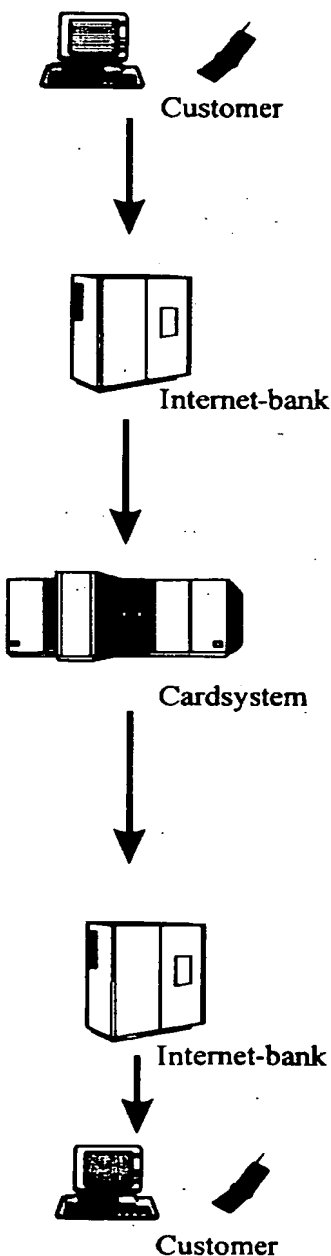
25

A log of the cardnumber together with relevant data is taken before, to prove that the payment has taken place. In general, an electronic log of all relevant data must be taken at all critical places in the system.

## OVERVIEW



## Functional Transaction-flow



The customer connects to an Internet-bank or a similar system (e.g. issuing cardcompany-system).

He selects the ikon "Internet Payment" and the system will return a list of the different debit/credit/customercards the customer has, and he then selects the debit/credit/customercard he wants to use for this particular payment.

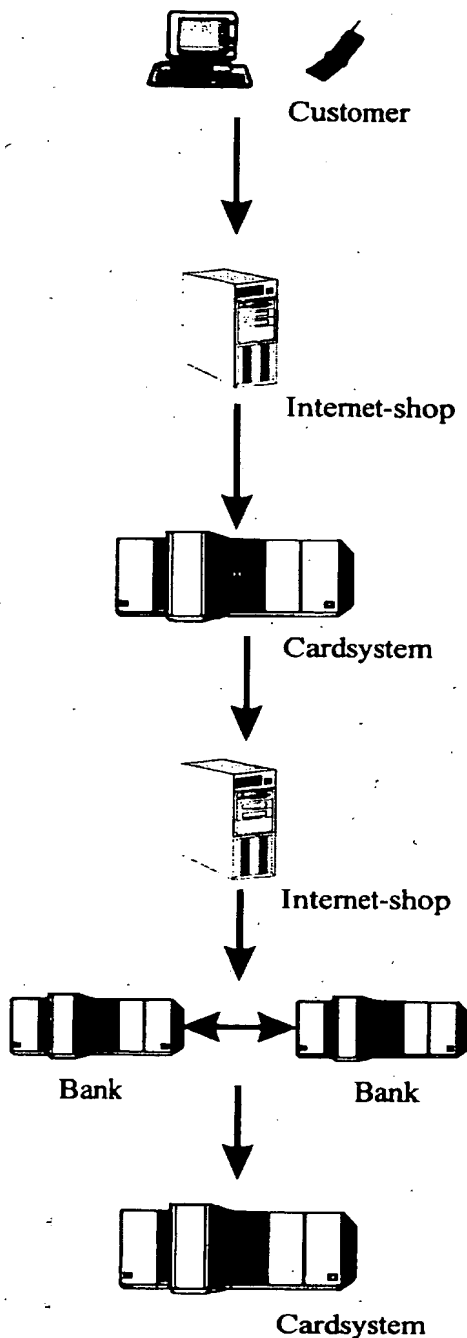
An on-line transaction is created, which contains all relevant data for identifying the customer (the system has already the relevant data). The transaction is constructed in such a way, that it will look like a request for issuing a new card. The transaction is now send to the system, which has the debit/creditcard database.

The receiving system, which contains the debit/credit-card data-base, will now issue a **virtual card**.

This is done the same way as when issuing a new physical card. The cardnumber is taken from the pool of free cards. The cardnumber is marked in the database as being in use by the customer, and a **timer is activated**. The expiringdate is set equal to the expiringdate of the customers already issued physical card. An on-line transaction is created containing the virtual cardnumber together with the expiringdate, and is send back to the Internet-bank.

The Internetbank-system, when receiving the transaction, will present for the customer the **virtual debit/creditcardnumber** and the expiring date.

Virtual cardnumber and expiringdate is received by the customer.



The customer can now use the virtual cardnumber and the expiring-date for buying goods from an Internet-shop (merchant). The customer will normally have been into the Internet-shop beforehand, and marked the items which he wants to buy. He will key-in the requested data and the virtual debit/creditcard number and expiring date.

The Internet-shop receives the data and will process the data as usual. The Internet-shop system cannot see the difference between the virtual cardnumber and a normal, physical cardnumber. A verification transaction is now send to the issuing cardsystem (e.g. VISA), as usual.

The system which has the debit/creditcard database, receives the verification transaction from the Internet-shop, and will verify, that the received data (incl. cardnumber and expiringdate) are valid. The timer will be set to 0 (zero) and deactivated.

An OK-transaction will be send back to the Internet-shop.

Settlement-transactions will be send between the relevant systems as usual.

When the settlement-transactions have taken place, the virtual debit/credit cardnumber will be deactivated and will be placed as a free debit/creditnumber in the carddatabase.